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FOREST INSECT INVESTIGATIONS

REPORT OF THE MOUNTAIN-PINE BEETLE SURVEY OF THE GALLATIN NATIONAL FOREST 1932

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INTRODUCTION

The survey of the Gallatin Forest in 1932 to determine the status of mountain-pine beetle infestation was conducted during August and September by the Forest Insect Field Station, Bureau of Entomology, Coeur d'Alene, Idaho, under a cooperative agreement with the Forest Service at Missoula. This survey was practically a duplication of the survey made in 1931 by the same agency and was part of the general program of reconnaissance to determine the status of mountain-pine beetle activity over the entire area included in the Yellowstone Park control project. This report depicts the status of the 1932 infestation on the southern part of the Gallatin Forest and compares it with similar data for 1931.

The 1932 survey of the Gallatin Forest included the Gallatin River drainage, the upper portion of the Madison River watershed outside of and adjacent to the western boundary of the Yellowstone Park, and that portion of the Gallatin Forest on the west side of the Yellowstone River from the Park boundary north to Bozeman. This reconnaissance covered the same areas as those surveyed in 1931, as well as more of the higher and remote portions of the forest where deep snow had prevented work the previous season. A large area on the Yellowstone River, where work was impracticable in 1931 because of snow, was included in the 1932 survey, making a total of about 940,000 acres surveyed. The crew engaged for the annual survey of the Beaverhead National Forest was used on this project.

GENERAL STATUS OF IBM INFESTATION

The data for the two years indicate a slight increase in the amount of mountain-pine beetle work in 1932. In 1931, the average loss for the forest was one tree to 55 acres while in 1932 it increased to one tree to 47 acres. In total infested trees this meant an increase from about 14,000 trees in 1931 to about 18,500 in 1932. Attacked lodgepole pine comprised about 4,400 of the 1931 total and approximately 13,900 of the 1932 total. Infested whitebark and limber pine decreased from about 9,600 in 1931 to slightly over 4,600 in 1932. In area, this general infestation, which can be classed as endemic, included somewhat less than 260,000 acres.

The remainder of the surveyed area consisted of drainages showing an infestation amounting to at least .1 of a tree per acre in either 1931 or 1932. Seven such areas were found in 1931 and four more were added in 1932. Excepting the Tepee Creek and the Placer Creek drainages, infestation on these areas increased in 1932. The areas added in 1932 included the following drainages: North Fork of Spanish Creek, Swan-Squaw Creek, Monument-Lodgepole Creek, Tom Miner-Horse Creek. Table I gives the location of each area by township and range and by drainage. Number of attacks per acre for each year, the per cent change in status and the number of acres for each unit showing a concentration of attack are given. The acreage infested on each unit is as close as can be estimated from the small percentage of the total area covered in the survey. Estimates of the total infested trees on each unit, by species, are given. A more intensive examination of the areas showing a concentration of beetle work was desirable but impossible with the short time available for the survey.

In the table and the discussion following it the timber type designated as whitebark pine includes both whitebark and limber pine.

TABLE I

AREAS CONTAINING IN EXCESS OF ONE MOUNTAIN-PINE BEETLE ATTACKED TREE FOR EVERY TEN ACRES - GALLATIN NATIONAL FOREST - 1932

Location of Area	Name of Drainage or Area	Attacked trees per acre 1931 LP	1931 PbP	1931 Total	1932 LP	1932 PbP	1932 Total	% Change in Status	Number of Acres Infested 1931	Number of Acres Infested 1932	Attacked Trees on Each Area by Species 1931 LP	1931 PbP	1931 Total	1932 LP	1932 PbP	1932 Total
	Bacon															
T10S R5E	Bibd Cr.	--	.174	.174	--	.2038	.2038	17.1	10,240	8,960	--	1,782	1,782	--	1,825	1,825
T11S R5E	Tepee															(1)
T11S R4E	Creek	.066	.127	.193	.0069	.0755	.0824	-57.3	10,240	10,880	676	1,300	1,976	75	822	897
T4S R2W	Placer															(2)
T5S R2E	Creek	.105	--	.105	--	--	--	--	2,560	100	269	--	269	10	20	30
T4S R2E	North Fork	(3)	(3)	(3)							(3)	(3)	(3)			
T5S R2E	Spanish Cr.	.013	.006	.019	.1238	--	.1238	552.9	4,480	4,480	58	27	85	555	--	555
T13S R4E	Denny															
T14S R4E	Creek	--	.143	.143	.0078	.1899	.1977	38.3	3,200	12,800	--	457	457	98	2,432	2,530
	Beaver															
T10S R3E	Creek	.007	.160	.167	.0795	.0397	.1192	-28.6	6,400	10,240	46	1,022	1,068	814	407	1,221
	Molheron															
T9S R7E	Creek	.141	--	.141	.0537	.2448	.2985	111.7	2,560	10,880	361	--	361	586	2,664	3,250
	Bad Luck															
T10S R2E	Creek	--	.850	.850	--	.2010	.2010	-76.4	640	1,920	--	544	544	--	386	386
T5S R5E	Swan-Squaw	(3)	(3)	(3)							(3)	(3)	(3)			
T5S R4E	Creek	.013	.006	.019	.1931	--	.1931	913.1	3,200	3,200	42	19	61	618	--	618
T9S &10S	Monument		(4)	(4)								(4)	(4)			
R5E	Lodgepole Cr.	--	.338	.338	.0233	.3846	.4079	20.6	7,040	7,040	--	2,379	2,379	164	2,706	2,870
T7 & 8S	Tom Miner-		(4)	(4)								(4)	(4)			
R5E & 6E	Horse Cr.	--	.0571	.0571	--	.1533	.1533	168.4	12,160	12,160	--	694	694	--	1,863	1,863
Totals &										(5)						
Averages:		.0232	.1311	.1543	.0353	.1588	.1941	25.8	62,720	82,660	1,452	8,224	9,676	2,920	13,125	16,045
Remainder of Gallatin & Old Madison Nat'l. Forests		.013	.006	.019	.0162	.0054	.0214	12.6	736,000	856,220	4,416	9,568	13,984	13,870	4,623	18,493

(1) This area showed a decrease to less than .1 tree per acre in 1932 but is included for the purpose of making comparisons. (2) Placer Creek fire area. (3) Average infestation over the general forest used as a basis for 1931 estimate on these areas. (4) Based on red-top count made in 1932. (5) Includes 10,880 acres on Tepee Creek drainage showing less than .1 tree per acre.

STATUS OF THE INFESTATION ON EACH UNIT

Bacon Rind Creek

This unit showed an increase in infestation per acre in 1932 but less acreage infested. Attacks were confined to the whitebark pine type and the slight increase in number of trees attacked probably resulted from infestation already present on the ground.

Tepee Creek

This area showed a surprising decrease in number of attacked trees per acre in both the lodgepole pine and the whitebark pine types. No reason for the decrease was apparent.

Placer Creek

The infestation around the edge of the preceding year's fire had greatly decreased in 1932, and no attacked trees were found on the strip run in adjacent timber.

North Fork of Spanish Creek

This unit, which had little infestation in 1931, showed a decided increase in 1932. It seems that the sharp decrease in infestation around the nearby Placer Creek fire and the increase on this unit is not merely a coincidence but an indication that the insects migrated from the Placer Creek fire to the Spanish Creek unit.

No concentration of insect work was noticed on the Spanish Creek drainage in 1931, although strip was run on that area that season.

When data from the preceding year for an area are not available two bases for estimating the infestation can be used. If a red-top count has been made it furnishes a workable basis. The second alternative requires the use of the

general estimate of infestation for the entire forest exclusive of the areas showing a concentration of insect work. The latter basis has been used for this unit and also for the Swan-Squaw Creek unit. Using that data, the 1931 general estimate includes both lodgepole pine and whitebark pine, while the 1932 data show only lodgepole pine attacked. Other units will show a similar discrepancy for the same reason and also because of variations in the location of strips.

Denny Creek

This unit showed a decided increase not only in number of trees attacked per acre but in the area covered. The increases, however, were not in excess of what could occur from infestation already present on the area.

Beaver Creek

The increase in infestation noted for this area could readily have been due to normal fluctuations of the infestation, or to differences in the location of the survey strip.

Molheron Creek

On this unit the greater infestation per acre and the materially larger attacked area in 1932 indicate the possibility of an outside source contributing to at least part of the increased infestation. The total increase from 1931 to 1932 was so great as to make it seem unlikely local infestation could have been entirely responsible. The logical source of invading insects lies many miles to the west and northwest, on the Beaverhead or Idaho forests.

Bad Luck Creek

This typical area of whitebark pine, at high altitudes, showed a decided decrease in amount of infestation per acre. Normal fluctuations in infestation

may have been the factor causing the decrease but migration of insects from the area seems the most likely cause of the reduction. Also, attacks subsequent to the examination of the area may have materially increased the number of attacked trees. Examinations of check strips on the Beaverhead National Forest show an appreciable number of attacks occurring subsequent to the date when the Gallatin survey was completed with influencing conditions reasonably similar on two forests. Therefore, it is quite possible that estimates of attacks for at least some and possibly all of the units are too low.

Swan-Squaw Creek

The small number of 1931 red-tops and the decided increase in attacked trees observed on this area in 1932 indicate quite strongly that outside sources caused most of the 1932 infestation. This unit contains some of the best quality and most extensive stands of lodgepole pine on the eastern side of the Gallatin River.

Monument-Lodgepole Creek

Infestation already present on the area probably caused the slight increase in 1932. This infestation was not observed in 1931, although strip was run on its northern edge. A red-top count in 1932 was the basis for the 1931 estimate of infestation.

Tom Miner-Horse Creek

The increase on this unit could easily have been due to insects already present on the area. Attacks were confined to the whitebark pine type, judging from the survey data. A red-top count furnished the basis for the estimate of the 1931 infestation.

GENERAL NOTES ON THE SURVEY

The preceding estimates were obtained from 617.2 miles of strip one chain broad on which were recorded 300 infested trees, 109 being lodgepole pine and 191 whitebark pine. Of the total strip mileage 278.0 miles were run in lodgepole pine, 100.7 in whitebark pine and the remaining 236.5 miles in open country or in types not containing timber susceptible to mountain-pine beetle attack. In 1932, the survey was made about a month earlier than in 1931. At the time of the survey in 1931 most of the high country containing whitebark pine was inaccessible due to deep snow. In 1932 the survey was conducted about a month earlier and much of this high country was accessible and examined. For this reason the 1932 data probably give a more representative picture of the bark beetle situation over the entire forest.

On the areas showing a concentration of mountain-pine beetle work in 1932 there was an average of .1539 trees per acre in the whitebark pine type, nearly twice as much as the .0840 trees per acre in the same timber type in 1931. Outside of the areas of concentrated attack, the infestation in whitebark pine was slightly less (.0054 trees per acre) in 1932 than for the preceding year(.006 trees per acre). In contrast, the lodgepole pine type, excluding the areas having a concentration of insect attacks, in 1932 showed .0162 trees per acre, a slight increase over the .013 trees per acre average of 1931.

STATUS OF THE LODGEPOLE PINE BEETLE (DENDROCTONUS MURRAYANAE HOPK.) ON THE GALLATIN NATIONAL FOREST

The lodgepole pine beetle continues to cause the death of many overmature or possibly otherwise decadent lodgepole pine. On approximately 3200 acres of strip, 50 trees killed by the beetle and nine in which it was associated with the mountain-pine beetle were recorded. From these data it is estimated that the average loss per acre for which the lodgepole pine beetle is solely

responsible is .015 trees per acre or about 14,100 trees for the entire forest. The same data show the loss per acre from a combined lodgepole pine and mountain-pine beetle attack to be about .003 trees per acre, or approximately 2,800 trees for the entire forest. The latter figure, however, is probably too low as many trees having only a few Dendroctonus murrayanae in the base of the tree associated with a heavy Dendroctonus monticolae attack are classified as mountain-pine beetle attacked trees.

Table II gives a condensed analysis of the survey.

TABLE II
SUMMARY AND ANALYSIS OF RESULTS AND COSTS
GALLATIN NATIONAL FOREST SURVEY - 1932

Items	Total	Man-days on Project: Effective field	Ineffective	Total
Man-days spent on survey	95-1/2	69	26-1/2	
Miles of sample strip	617.2			
Miles of strip per man-day	6.47	8.94		6.47
No. of sample strip acres	4937.5			
per man-day		71.5		51.76
Acres covered by survey	936,880			
Acres covered per man-day		13,607		9,831
Mileage covered by car	3,484			

Total Cost of Survey	
Labor	$562.85
Transportation	65.56 (Car)
Subsistence	347.40
Equipment	--
Telephone & Telegraph	.20
	$976.01

Cost of Survey Distributed	
Cost per man-day	10.22
Cost per mile of strip	1.58
Cost per sample acre	.198
Cost per acre of region surveyed	.00104
Per cent of total area actually covered	.53

Ineffective time as follows in man-days:

Travel	16 - To and from project.
Sickness	6-1/2
Bad weather	4

SUMMARY

The more important findings revealed by this survey are as follows:

(1) The 1932 infestation of the mountain-pine beetle is slightly heavier than in 1931, but still quite light over most of the forest.

(2) The number and acreage of the areas showing a concentration of mountain-pine beetle attack increased in 1932.

(3) On three of the seven areas showing concentration of infestation in 1931 there was a decrease in number of infested trees in 1932, but the increase on the other four areas raised the average number of attacks to approximately 57% above the estimate for 1931.

(4) The seven areas which in 1931 showed a concentration of mountain-pine beetle attack increased in acreage from 35,840 in 1931 to 55,780 in 1932, about 54%.

(5) The finding of four new areas of concentration of insect work indicates in two instances that the source of infestation was distant. Local infestation was probably responsible for the increase in number of attacks in the other two units.

(6) The 1932 data indicate the mountain-pine beetle infestation is lighter in the lodgepole pine than in the whitebark pine type.

Respectfully submitted,

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